JC07 Rec'd PCT/PTO 0 4 DEC 2001 FORM PTO-1390 (REV. 9-2001) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE ATTORNEY 'S DOCKET NUMBER COL 207 TRANSMITTAL LETTER TO THE UNITED STATES US APPLICATION NO. (If known, see 37 CFR 1.5 DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371 UU932 INTERNATIONAL APPLICATION NO. INTERNATIONAL FILING DATE PRIORITY DATE CLAIMED PCT |BE 00 | 000 59 3 JUNE 2000 4 JUNE 1999 TITLE OF INVENTION TO A CUTTING IMPROVEMENTS ATTACHEMENT APPLICANT(S) FOR DO/EO/US ANDRÉ COLENS Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information: 1. This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below. 4. The US has been elected by the expiration of 19 months from the priority date (Article 31). 5. A copy of the International Application as filed (35 U.S.C. 371(c)(2)) is attached hereto (required only if not communicated by the International Bureau). has been communicated by the International Bureau. is not required, as the application was filed in the United States Receiving Office (RO/US). 6. An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). is attached hereto. has been previously submitted under 35 U.S.C. 154(d)(4). 7. Amendments to the claims of the International Aplication under PCT Article 19 (35 U.S.C. 371(c)(3)) are attached hereto (required only if not communicated by the International Bureau). have been communicated by the International Bureau. have not been made; however, the time limit for making such amendments has NOT expired. have not been made and will not be made. 8. An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)). 9. An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. An English lanugage translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). Items 11 to 20 below concern document(s) or information included: 11. 🛛 An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. A FIRST preliminary amendment. 14. A SECOND or SUBSEQUENT preliminary amendment. 15. A substitute specification. 16. A change of power of attorney and/or address letter. 17. A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825. A second copy of the published international application under 35 U.S.C. 154(d)(4). 18. A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). 20. 🔯 Other items or information: CXT COPY OF INT. PRELIMINARY EXAMINATION REPORT

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:

André Colens

Serial No:

Art Unit:

Filing Date:

Title:

IMPROVEMENTS TO A CUTTING ATTACHEMENT

PCT No.:

PCT/BE00/00059

Filing Date: 3 June 2000

Priority:

Country: Belgium

No.: 9900397

Filing Date: 4 June 1999

December 4, 2001

Attorney's Docket No.: COL207

REQUEST TO ACCEPT PATENT APPLICATION FOR ENTERING UNITED STATES NATIONAL PHASE UNDER 35 USC §371

Hon. Commissioner of Patents and Trademarks

Box PCT

Washington, D.C. 20231

SIR:

A patent application related to the above identified application was filed on 3 June 2000 under the PCT Treaty under the docket number PCT/BE00/00059.

An English translation of the originally filed PCT application PCT/BE00/00059 is enclosed with this filing.

It is respectfully requested that the present application be treated as an application filed under the Section 35 U.S.C. § 371 for transferring a PCT application PCT/BE00/00059, naming the United States, into the national phase and that the present application be granted any and all benefits and in particular those benefits relating to a priority recognition of prior filings under jurisdiction of treaty members and available under the Patent Cooperation Treaty (Washington Treaty), the Paris Convention Treaty, and under the United States Code based on the filing under the Patent Cooperation Treaty of PCT application PCT/BE00/00059.

If there should be any problems in granting the benefits available under the Patent Cooperation Treaty and/or 35 USC §371 based on such items as incompleteness of application, excessive time delays or defective application papers, then it is alternatively respectfully requested that prior to the expiration through abandonment of a filing under 35 USC §371 and under charging the required fees from deposit account, the present application be treated as an application and/or continuation application filed at a time required under any one of the sections 35 U.S.C. §111, 35 U.S.C. §363, and/or 35 U.S.C. §365(c) as applicable and that the present application be treated as a continuation or continuation-in-part application of the PCT application PCT/BE00/00059.

Recognition of PCT national phase status or, respectively, continuation or continuation-in-part status under the PCT Treaty and/or of the claimed priority date of 4th June 1999 is respectfully requested for the patent application documents in the above captioned matter.

Respectfully submitted,

André Colens

By:

Horst M. Kasper, his attorney,

hun M Kann

13 Forest Drive, Warren, N.J. 07059 Tel.:(908)526-1717 Fax:(908)526-6977

Reg. No. 28,559; Docket No.: COL207

^{*%}ptn:pctnat:1(COL206R1(December 4, 2001(tm

10/009327

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:

André Colens

Serial No:

Art Unit:

Filing Date:

Title:

IMPROVEMENTS TO A CUTTING ATTACHEMENT

PCT No.: PCT/BE00/00059

Filing Date: 3 June 2000

Priority:

Country: Belgium

No.: 9900397

Filing Date: 4 June 1999

December 4, 2001 Attorney's Docket No.: Col207

CLAIM OF PRIORITY

Hon. Commissioner of Patents and Trademarks

Box PCT

Washington, D.C. 20231

Sir:

Pursuant to Title 35, United States Code, Section 119 (1952), the undersigned hereby claims the benefit of the filing date of a prior foreign patent application forming a basis of the PCT application viz.:

Country:

Belgium

Application No.: 9900397

Date of Filing:

4 June 1999

In support of this claim, a certified copy of the aforementioned foreign patent application is believed to have been submitted by the World Intellectual Property

Organization and should have been received by the United States Patent and Trademark Office prior to the expiration of 20 months from the first priority date of the application.

Respectfully submitted,

André Colens

By:

Horst M. Kasper, his attorney,

13 Forest Drive, Warren, N.J. 07059

MMM Kasper

Tel.:(908)757-2839 Fax:(908)668-5262 Reg.No. 28559; Docket No.: COL207

^{*%}ptn:pctnat:2(COL207PC(December 4, 2001(tm

THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:

André Colens

Serial No:

Art Unit:

Filing Date:

Title:

IMPROVEMENTS TO A CUTTING ATTACHEMENT

PCT No.:

PCT/BE00/00059

Filing Date: 3 June 2000

Priority:

Country: Belgium

No.: 9900397

Filing Date: 4 June 1999

December 4, 2001

Attorney's Docket No.: COL207

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents and Trademarks

Box PCT

Washington, D.C. 20231

SIR:

This is a preliminary amendment to provide certain corrections in the above captioned patent application. The applicant petitions that, if required, the time for response be extended and the corresponding fee be charged. The Commissioner is hereby authorized to charge any additional fees, which may be required to Acct. No. 11-0224. The Applicant further respectfully requests that this response be accepted as a bona fide effort to meet any potential response requirements outstanding and due in the above captioned matter.

Please amend the application as follows:

IN THE CLAIMS:

Please **delete** claims 1 through 11 as filed with the international application PCT/BE00/00059 on June 3, 2000 without prejudice to their reintroduction at a later point in time.

Please **introduce** the following new claims:

- 12. A cutting attachment for a mowing machine, particularly for a lawn mower, linked to the chassis of said machine, comprising a motor whereof the driving shaft is linked to a cutter disk perpendicular to said shaft and provided at its periphery with at least one blade, and a bottom plate substantially parallel to, and located beneath the cutter disk, wherein the periphery of the bottom plate has substantially coplanar extensions, extending radially beyond the zone reachable by the blades and wherein the circular plate has a size, excluding the extensions, which is substantially equal to or smaller than the size of the cutter disk excluding the blades.
- 13. A cutting attachment as claimed in claim 12 wherein the bottom plate is mounted freely on the pin of the cutter disk via a roller bearing or the like.

PCT/BE00/00059 COL207A1 12/03/2001 page 2

- 14. A cutting attachment as claimed in claim 12 wherein the extensions are provided in the form of prongs having a rounded profile made of hollows and tips.
- 15. A cutting attachment as claimed in claim 14, wherein the distance between two tips or ends of adjacent extensions ranges from 2 cm to 5 cm.
- 16. A cutting attachment as claimed in claim 12, wherein the number of extensions ranges from 10 to 60, preferably from 20 to 40.
- 17. A cutting attachment as claimed in claim 12 linked to the chassis via a suspension system.
- 18. A cutting attachment as claimed in claim 12, wherein the ends of the extensions are slightly upwardly curved.
- 19. A mower having a cutting attachment as claimed in claim 12.
- 20. A mower as claimed in claim 19 characterized in that it is a robotic lawnmower.
- 21. A mower as claimed in claim 20 characterized in that it is suitable for mowing golf courses, more particularly practice courses.

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REMARKS

Claims 1 through 11 were in the application as originally filed. Claims 1 through 11 are being cancelled. New claims 12 through 21 are being introduced.

The present preliminary amendment is submitted in order to improve claim language and to eliminate multiple dependencies between claims.

Should be there any multiple dependent claims remaining, such remaining multiple dependent claims are to be deemed as treated as canceled by the applicant.

Entry of the above-recited corrections prior to calculation of the fee is respectfully requested.

Respectfully submitted,

André Colens

By:

Horst M. Kasper, his attorney

13 Forest Drive, Warren, N.J. 07059

Tel.: (908)526-1717; Reg. No. 28559 Attorney's Docket No.: COL207

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PCT/BE00/00059

COL207A1

12/03/2001

page 4

André Colens

Title:

IMPROVEMENTS TO A CUTTING ATTACHMENT.

Horst M. Kasper, his attorney 13 Forest Drive, Warren, NJ 07059 Tel. (908) 757-2839; Reg. No. 28559 Attorney's Docket No.: COL207

ENGLISH LANGUAGE TRANSLATION OF THE INTERNATIONAL PCT APPLICATION AS FILED

PCT Application no: PCT/BE00/00059 3 June 2000

Filing Date:

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Improvements to a cutting attachment.

This invention concerns an improvement to a cutting attachment, more particularly to a cutting attachment for a robotic lawn mower.

Robotic lawn mowers are particularly suitable for the care of large lawn surfaces, for instance those of golf courses.

Care of golf "practice courses", where players do their training and practice their "drive", is not easily taken by conventional means. In fact, practices are covered with a number of balls thrown by players and all balls have to be picked up to allow mowing, to prevent both balls from being damaged and mowers from being jammed. Further, players have to stop any practice when lawns are mowed, to prevent any injury to the personnel, and this considerably limits the use of the practice course.

Patent application no. PCT/BE96/00012 discloses a cutter disk having retractable blades, protected on its bottom face by another, substantially parallel, freely rotating disk. This cutter disk may be used with robotic lawn mowers such as those described in application no. PCT/BE98/00038, the motor-cutter disk

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assembly being mounted in a flexible manner with respect to the chassis, so that it can follow ground irregularities.

Nevertheless, this system is not suitable to mow a golf practice course, since it would itself cause damages to balls. In fact, retractable blades can come in contact with balls. Tests have been done by varying the cutting height, but balls remain a little suspended over the grass, as a function of the height and density of the lawn. As a result, even when mowing at a height above the diameter of balls, the latter are damaged.

Therefore, there exists a definite need to develop a cutting attachment for mowing golf courses in the presence of golf balls, which is particularly adapted to automatic mowing of practice courses with no human intervention, and possibly even allows players to continue their practice.

To this end, this invention suggests an improvement to a robotic lawn mower, e.g. the one described in patent application no. PCT/BE98/00038, consisting of a cutting attachment which allows mowing in the presence of hard, small-sized objects, as compared to the cutting attachment, more particularly in the presence of golf balls, without damaging them.

According to the invention, the freely rotating disk or plate proposed in the above application is provided with extensions, or "prongs", which extend radially from its periphery so that balls or other equivalent objects may be maintained out of the reach of the retractable blades, while allowing the latter to reach and cut the grass like in prior art. The system

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for suspending the cutting attachments allows the latter to be lifted. When the robotic lawn mower passes, the balls beneath the freely rotating disk are not touched by the blades. Friction is also reduced as compared to the fixed disk application, since the forward movement of the machine is coupled to the rotation of the disk in contact with the ball.

The other advantages provided by the presence of the disk as described in patent application no. PCT/BE96/00012 are maintained, particularly the self-cleaning and jam-preventing properties.

To this end, it shall be noted that the addition of peripheral prongs to a not freely rotating disk involves a specific undesirable obstruction before the disk. This obstruction is caused by the collection of grass blades of variable length by the prongs as the machine advances. Thanks to the free rotation proposed according to one of the variants of the invention, the forwardly directed prongs are directed backwards after a half-turn, and the friction with the lawn grass causes said grass to be released and the pronged disk to be cleaned.

This change to the disk as compared to prior art also increases cutting system safety. When in contact with a living being or an object to be protected, the modified disk will prevent or strongly reduce any direct contact with the blades. Therefore, the device according to the invention might also be advantageously used in non robotic cutting devices (bush-cutters, mowers).

Hence, this invention proposes a cutting

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attachment for a mowing machine, particularly for a lawn mower, comprising a motor whereof the driving shaft is linked to a cutter disk perpendicular to said shaft and provided at its periphery with at least one blade, and a bottom plate substantially parallel to, and located beneath the cutter disk, characterized in that the bottom plate periphery has substantially coplanar extensions or prongs, extending radially beyond the zone reachable by the blades.

The bottom plate or disk is substantially circular and has a diameter, excluding the extensions, which is substantially equal to or smaller than the one of the cutter disk. By way of example, in the case of a robotic lawn mower, the cutter disk may have a smaller diameter ("excluding the prongs") of 22 cm and an "outside" diameter of 29 cm.

The bottom plate is mounted freely on the cutter disk pin via a roller bearing, e.g. a ball bearing, or the like.

20 Extensions are provided in the form of prongs having a rounded profile (hollows and tips). The distance between two tips or ends of adjacent extensions 33 ranges, for instance, from 2 cm to 5 cm. The number of extensions per bottom plate preferably ranges from 10 to 60, more preferably from 20 to 40.

The cutting attachment is preferably linked to the chassis via a suspension system.

The cutting attachment will be preferably suitable for a robotic lawn mower, particularly for mowing golf courses, more particularly for mowing practice courses.

The invention will be understood more clearly

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from the following description, with reference to one embodiment, and particularly to the drawings annexed by way of non-limiting examples.

Fig. 1 is a bottom view of the plate of a cutting attachment according to the invention.

Fig. 2 is a sectional side view of a cutting attachment mounted on a member of the chassis.

Figs. 3a through 3c show the operation of the cutting attachment in the presence of a ball according to prior art(Fig. 3a) and according to the invention (Figs. 3b-c).

In Fig. 1 the bottom circular plate 3, freely rotating about the cutting axis 6, is recognizable. The cutter disk 2 is situated above the plate 3, and is driven by the motor, parallel to the plate. The cutter disk has three blades 1 at its periphery, which extend radially and can pivot freely about an axis of rotation 4 and retract thereafter beneath the cutter disk under the effect of an excessive resistance. The bottom plate 3 (freely rotating protective disk) is provided with regular, coplanar extensions 33 at its periphery in the form of rounded prongs extending beyond the zone that the extracted blades can reach by the centrifugal force due to the rotation of the cutter disk. The distance between two radial ends of the extensions is smaller than the size of the objects, in this case of golf balls. Balls are kept out of the reach of the free blades between two adjacent extensions. When the grass is cut balls are not touched by the blades.

As the robotic lawn mower advances, the cutter disk will pass over the balls, partly by free rotation

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thereof, partly by friction.

According to a variant, which is currently less preferred, the ends of the extensions may be upwardly curved.

5 Fig. shows more particularly a attachment which is mounted in a well-known suspended arrangement (suspension rod 7, spring 17) on a member 8 of the chassis. The numeral 5 denotes the location of the ball bearing allowing free rotation of 10 protective plate 3, all other numerals being equally provided in Fig. 1. It shall be noted that the extensions 33 of the plate 3 extend radially slightly beyond the extracted blades 1.

Figs. 3a-b show the contact between the cutting attachment and a spherical object, e.g. a golf ball. In Fig. 3a, the cutting attachment is a prior art cutting attachment. As the lawn mower advances, the ball 9 is damaged in 10 by the rotating blades 1, before passing under the "floating" cutting attachment, totally in friction, particularly under the freely rotating plate 3.

Figs. 3b and 3c show the contact between the cutting attachment of the invention and a golf ball. The extensions 33 of the plate 3 prevent the blades from contacting the ball, which will advantageously pass beneath the freely rotating plate, while the cutting attachment is lifted. At the same time, the ball itself will generally sink to a certain extent into the grass, and will pass beneath the plate with a minimized friction (Fig. 3c).

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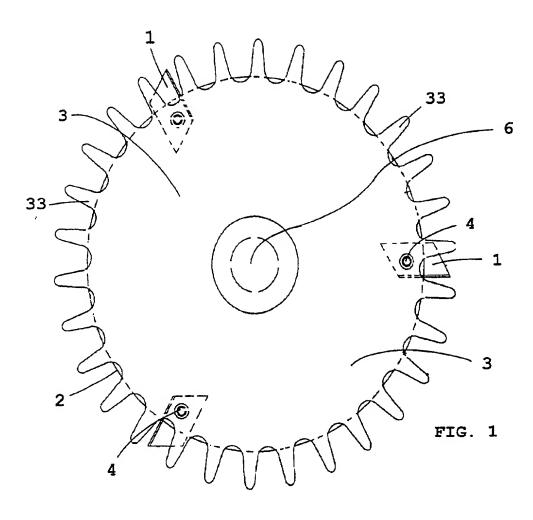
CLAIMS.

- 1. A cutting attachment for a mowing machine, particularly for a lawn mower, comprising a motor whereof the driving shaft (6) is linked to a cutter disk (2) perpendicular to said shaft and provided at its periphery with at least one blade (1), and a bottom plate (3) substantially parallel to, and located beneath the cutter disk (2), characterized in that the periphery of the bottom plate (3) has substantially coplanar extensions (33), extending radially beyond the zone reachable by the blades (1).
- 2. A cutting attachment as claimed in claim 1, wherein the circular plate (3) has a size, excluding the extensions (33), which is substantially equal to or smaller than the size of the cutter disk (2) excluding the blades (1).
- 3. A cutting attachment as claimed in any preceding claim, wherein the bottom plate (3) is mounted freely on the pin (6) of the cutter disk (2) via a roller bearing or the like.
- 4. A cutting attachment as claimed in any preceding claim, wherein the extensions (33) are provided in the form of prongs having a rounded profile (hollows and tips).
- 5. A cutting attachment as claimed in any preceding claim, wherein the distance between two tips or ends of adjacent extensions (33) ranges from 2 cm to 5 cm.
- 6. A cutting attachment as claimed in any preceding claim, wherein the number of extensions

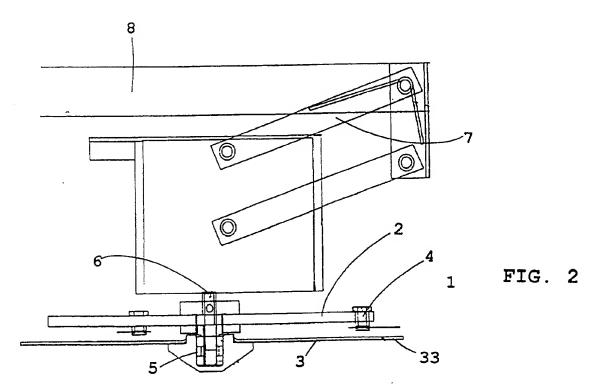
ranges from 10 to 60, preferably from 20 to 40.

- 7. A cutting attachment as claimed in any preceding claims, linked to the chassis via a suspension system.
- 8. A cutting attachment as claimed in any preceding claim, wherein the ends of the extensions 33 are slightly upwardly curved.
 - 9. A mower having a cutting attachment as claimed in any preceding claim.
- 10. A mower as claimed in the preceding claim, characterized in that it is a robotic mower.
 - 11. A mower as claimed in any claim, characterized in that it is suitable for mowing golf courses, more particularly practice courses.

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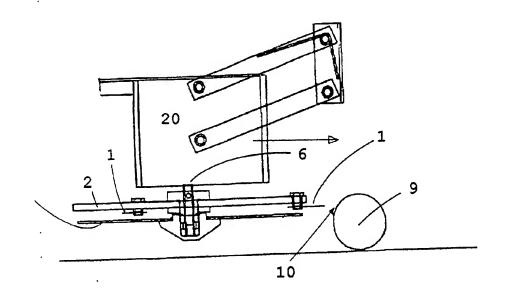
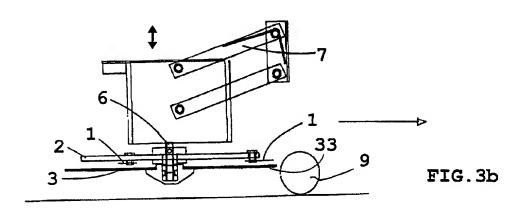
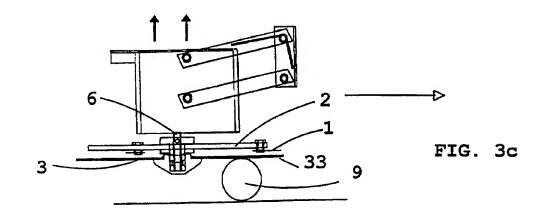


FIG. 3a

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